

Claims

1. A magnetic resonance imaging apparatus comprising a pair of static magnetic field generating sources opposingly disposed on both sides of an imaging space and a gradient magnetic field generating part disposed on the imaging space side of each static magnetic field generating source for applying a gradient magnetic field to the imaging space, wherein

the static magnetic field generating sources each comprise a magnetic field generating coil and a closed vessel enclosing the magnetic field generating coil inside, the gradient magnetic field generating part is supported on a face of the closed vessel on the imaging space side, and

the closed vessel has a rigid structure for preventing transmission of vibration generated by the gradient magnetic field generating part to other members via the closed vessel.

2. The magnetic resonance imaging apparatus according to claim 1, wherein the rigid structure has at least one connecting part connecting a face on the imaging space side and a face confronting the face of the closed vessel inside the closed vessel.

3. The magnetic resonance imaging apparatus according to claim 2, wherein the rigid structure further comprises a rigid reinforcing member fixed on the face confronting the face on the imaging space side of the closed vessel.

4. The magnetic resonance imaging apparatus according to claim 3, wherein the rigid reinforcing member comprises at least one of a plate member and a grid member.

5. The magnetic resonance imaging apparatus according to claim 4, wherein the plate member is integrally formed

with the closed vessel by making a wall thickness of the face confronting the face on the imaging space side of the closed vessel larger than the wall thickness of the face on the imaging space side.

6. The magnetic resonance imaging apparatus according to claim 1, which further comprises a fixing means for fixing the gradient magnetic field generating part to the closed vessel, and wherein the gradient magnetic field generating part is integrated with the closed vessel by the fixing means.

7. The magnetic resonance imaging apparatus according to any one of claims 3 to 5, wherein each closed vessel has a first recess provided for the face on the imaging space side,

the connecting part comprises one or more through-holes provided inside so as to penetrate from the face on the imaging space side to the face confronting the foregoing face,

each gradient magnetic field generating part is fixed in the first recess, and

in at least one of the through-holes, cables for gradient magnetic field for supplying a current to the gradient magnetic field generating part are disposed.

8. The magnetic resonance imaging apparatus according to any one of claims 3 to 5, wherein the closed vessel has a second recess in the face confronting the face on the imaging space side, and the rigid reinforcing member is disposed inside the second recess.

9. The magnetic resonance imaging apparatus according to claim 7, wherein the through-holes are provided near the side face of the first recess.

10. The magnetic resonance imaging apparatus according to claim 7, wherein at least one of the through-

holes is provided at an approximate center of the first recess.

11. The magnetic resonance imaging apparatus according to claim 7, wherein the rigid reinforcing member is provided with one or more pathways communicating with the through-holes in the inside thereof, and the cables for gradient magnetic field are disposed in one of the pathways.

12. The magnetic resonance imaging apparatus according to claim 11, which further comprises a means for circulating a refrigerant for cooling the gradient magnetic field generating part, and wherein the gradient magnetic field generating part is provided with a means for passing the refrigerant inside, and

 piping for supplying the refrigerant to the gradient magnetic field generating part is disposed in at least one of the through-holes and a pathway communicating therewith.

13. The magnetic resonance imaging apparatus according to claim 12, which further comprises a pair of high frequency magnetic field generating parts for generating a high frequency magnetic field in the imaging space, and wherein each of the pair of high frequency magnetic field generating parts is disposed on the imaging space side with respect to the gradient magnetic field generating part, and

 in at least one of the through-holes and a pathway communicating therewith, cables for high frequency magnetic field for supplying a current to the high frequency magnetic field generating part are disposed.

14. The magnetic resonance imaging apparatus according to claim 13, wherein three or more of the through-holes are provided in the closed vessel, and the cables for gradient magnetic field, the cables for high frequency magnetic field and the piping are disposed

individually in the different through-holes and the different pathways communicating therewith.

15. The magnetic resonance imaging apparatus according to claim 14, wherein the different pathways join inside the rigid reinforcing member to have a number smaller than the number of the through-holes, and communicate with the outside of the rigid reinforcing member.

16. The magnetic resonance imaging apparatus according to claim 15, wherein a partition is provided in the joined pathways for separating a space through which the cables for gradient magnetic field or the cables for high frequency magnetic field pass and a space through which the piping passes in the pathway, and the partition is constituted with a material of high thermal conductivity.

17. The magnetic resonance imaging apparatus according to claim 16, wherein the piping is disposed at a position perpendicularly under the cables for gradient magnetic field or the cables for high frequency magnetic field.

18. The magnetic resonance imaging apparatus according to claim 7, wherein the through-hole has an opening inside the first recess, the gradient magnetic field generating part has a current receiving terminal at a position of the opening of the through-hole, the cables for gradient magnetic field have a current supplying terminal, and the current supplying terminal is connected to the current receiving terminal.

19. The magnetic resonance imaging apparatus according to claim 7, wherein the cables for gradient magnetic field is fixed in the through-hole with a fixing member.

20. The magnetic resonance imaging apparatus

according to claim 12, wherein the through-hole has an opening inside the first recess, the gradient magnetic field generating part has a refrigerant receiving terminal at a position of the opening of the through-hole, the piping has a refrigerant supplying terminal, and the refrigerant receiving terminal is connected to the refrigerant supplying terminal.

21. The magnetic resonance imaging apparatus according to claim 20, wherein the piping, the refrigerant supplying terminal and the refrigerant receiving terminal are constituted with a conductive material, so that they serve also as the cables for gradient magnetic field supplying an electric current to the gradient magnetic field generating part.